

Left-handedness--Facts and Fiction

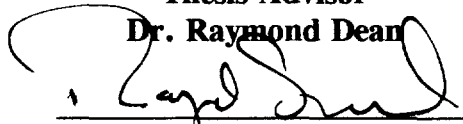
An Honors Thesis (HONRS 499)

by

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A handwritten signature in black ink, appearing to read 'Raymond Dean', written over a horizontal line.

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Prologue

The end of a long tunnel of formal education was drawing near. Having one year left at Ball State University, I began to contemplate ideas for my senior thesis to "wrap-up" all the knowledge I had accumulated during the past three years. Majoring in business education, I had a wide variety of subjects from which to choose such as computers, educational philosophies, accounting, curriculum, etc. One topic, however, continually surfaced to the top of my mental list: how to survive in a right-handed world. The following paper encompasses many aspects of being left-handed. Accompanying the many facets of research, I have included anecdotes, stories, personal discoveries, and observations from my own left-handedness. I chose this particular topic not only for my interest in the subject but for the enjoyment and enlightenment of everyone--be they right-handed, left-handed, or ambidextrous. Aspects within this document can be applied in the classrooms, offices, and personal lives.

Introduction

Almost every left-hander has experienced the same scenario of walking into a classroom and finding nothing but right-handed desks. Although adjusting to a right-handed world has become commonplace for left-handers, few obstacles pose a problem as great as the one a left-hander confronts when attempting to conform to a desk built exclusively for right-handers. In order to write on such a desk, "southpaws" must twist their bodies while making an extended reach with their writing arm until it is positioned awkwardly in front of the opposite side of the body. These desks inhibit left-handers from attaining any elbow support for writing and afford little, if any, room to rest their hand while writing on the left side of the paper.

The common classroom desk is technically known as the tablet armchair. The design allows only a small, narrow writing surface fastened to one side of a chair. Although the tablet armchair is not praised by students for its comfort, it has become a favorite of administrators as it is relatively inexpensive and less bulky compared to other types of classroom desks. Because of these attributes, the tablet armchair has become the most popular desk in college classrooms. Ideally, the percentage of left-handed desks in a classroom should reflect the percentage of left-handers within the population. Current statistics show left-handedness to be between ten and fifteen percent of the total population (Kandler, 1987). The majority of schools, however, do not reflect these statistics, and thus order less than the optimum. As I am left-handed and have experienced the above scenario, I have become increasingly interested in the development of the left-handed individual.

History

Left-handedness has a deep seeded background which is known to have less than a positive outlook. Is there anything sinister about being left-handed? Webster's Third International Dictionary lists several definitions of the adjective *left-handed*, including the following: (a) marked by clumsiness or ineptitude; awkward; (b) exhibiting deviousness or indirection; oblique, unintended; (c) given to malevolent scheming or contriving; sinister, underhand.

Left-handers are frequently referred to as "sinistrals." In other languages as well, the terms for left or left-handed have almost always contained at least one derogatory meaning, ranging from "clumsy" or "awkward" to "evil" (Springer & Deutsch, 1989). The word left comes from the Old English word *lefte* meaning weak or worthless. Our word right comes from the Old English *riht* which means straight and correct. In Latin the word for left is translated sinister, which in English means something underhanded or bad. The French word for left is *gauche*. Left in German is *linkisch*, which also means awkward. The Russian word for left, *nolero*, means doing it in a sneaky way. The Spanish word, *zurdo*, means on or toward the left hand (Westra, 1989).

The English word for being able to use either hand, ambidextrous, literally means right-handed on both sides. Right, referring to the right side, also means proper or correct. Throughout time, left has also been associated with evil. The ancient Romans linked left with the "evil one." They even employed servants, called footmen, to ensure that all guests entered Roman houses right foot first. To do

otherwise was considered unlucky. The early Greeks associated the left with fortune telling. Early Christians linked left with the devil and evil spirits, which led to the left-handed practices in black magic.

Reflecting the attitudes of the time, religious art usually showed Christ or God bestowing blessings with the right hand, while the devil hurled curses with the left. Some cultures still honor the right hand and scorn the left. In the Middle East, meals are eaten with the right hand and everyone scoops from a common bowl. To dip into the common bowl with your left hand would be a grave social blunder (Herron, 1980).

Common usage of left and right within American culture continues to indicate bias. Politics and beliefs of the right are considered moderate or conservative, while those on the left are radical. We feel "left out" when we are ignored, are "out in left field" when our ideas seem strange to others, and want our "rights" when we feel we have been wronged. We pay "left-handed compliments" when we do not mean them and are "right-on" when correct (Westra, 1989).

In our world today, left-handers are a minority. Eighty-five to ninety percent of this world's population is right-handed. "Lefties" are different. To be left-handed in a right-handed world is often troublesome. The daily implements of our lives are made for use with the right hand. Since left-handedness was more unusual in the past, it was considered odd and was feared. The cause for its very existence was unknown to ancient man; therefore, along with many other things he could not explain, he attributed it to the power of evil. Attitudes regarding left-handedness are, however, changing throughout the world. Many new products are now designed just for left-

handers. Left-handed children are no longer forced to become right-handed and the world is slowly awakening to the needs and talents of "lefties." Left-handers no longer want to be "left out, left behind, left over, put in left field, or given any left-handed compliments."

Cause

A question which continues to intrigue neurologists, behavioral psychologists, as well as the general public is "what causes left-handedness?" We do know that left-handedness is an observable phenomenon and depending upon the sampling and what kind of test is given to determine handedness, the statistic most widely accepted states that ten to fifteen percent of the population is left-handed. Right-handedness, however, still seems to be the rule, or the norm, and left-handedness a deviation from that norm.

Research from almost a century ago led scientists to discover that in most humans one side of the brain appeared to be responsible for the operation of the other side of the body, or that our brains seem generally to be wired contralateral. This led to the theory that people who prefer to use their left hands are right brain dominant while those who are right-handed were conversely left brain dominant as far as motor control was involved (Hecaen & Ajuriaguerra, 1964).

The left side of the brain is considered responsible for logic, linear thinking, and verbalization, while the right side is more visual, spatially oriented, holistic, and intuitive. The two hemispheres specialize in different functions. Researchers realized that motor control was not the only factor in brain dominance. Brain dominance

actually had to do with which hemisphere had control of the language function and it was that factor which was responsible for cognitive style in an individual.

It was discovered that the majority of people, both right-handed and left-handed, had their language centers in the left brain. But while approximately ninety-five percent of right-handers had this form of lateralization, only seventy percent of all left-handers were left brain dominant. In the remaining thirty percent, approximately fifteen percent had their language capabilities in both hemispheres (Ireland, 1990). Consequently, left-handedness does not appear to be simply the converse of right-handedness.

Theories

There are several theories about what actually causes left-handedness, all of which have been substantiated by research to varying degrees. One theory is that handedness is genetic and is thereby inherited, as are blue eyes or brown hair. Another theory contends that all left-handedness is essentially pathological in origin and that trauma occurring during the birth process can account for most of it. The particular trauma is a deprivation of oxygen that results in a left hemisphere motor dysfunction. There have also been studies done which have shown a maternal age variable with significantly more left-handers first born to mothers thirty years and older (Beaton, 1985).

Another theory developed when statistics showed an overabundance of left-handers who suffered from diseases of the immune system. It was hypothesized that there was a common factor delaying the development of the left hemisphere and the

thymus gland which plays an important part in the body's immune system, and that this factor might be an excess of testosterone in the developing fetus. This theory would be supported by the fact that there are more male left-handers than female by a ratio of three to one.

Yet another theory suggests that since we live in a right-handed culture, our environment influences us and it is a learning process which makes us right-handed. People who are left-handed have failed to become acculturated in this respect (Ireland, 1990). It is more probable that there are many varied influences that determine an individual's left-handedness. Left-handedness may have links to other neurological factors which continue to be discovered. Although all of the research that is done on handedness is of importance, it is also important that the explorations be examined closely.

Handedness and Functional Asymmetry

While attending junior high school, I participated in a problem-solving class. We discussed brain asymmetry in simple terms. It remains the topic concerning handedness that I have found most intriguing.

In what way does the brain organization of left-handers differ from that of right-handers? Both clinical and behavioral studies have helped answer this question. A procedure called the "Sodium Amobarbital Procedure" temporarily anesthetizes one hemisphere of the brain at a time, allowing a neurosurgeon to determine which half of the brain controls speech in a given patient about to undergo brain surgery. A summary of sodium amobarbital testing at the Montreal Neurological Institute reported

that over ninety-five percent of the right-handers had speech localized to the left hemisphere, and seventy percent of the left-handers showed the same pattern. Of the left-handers remaining, half showed right-hemisphere control of speech, and half had speech represented bilaterally (Springer & Deutsch, 1989).

From these figures, one might conclude that the majority of left-handers are just like right-handers, whereas many of the others show a reversal of the pattern found in right-handers. Research had identified another variable that may help sort left-handers into different groups on the basis of brain organization. The majority of left-handers write in an inverted or hooked position, holding the pen or pencil above the line of writing. Some left-handers, as well as almost all right-handers, hold their writing instruments below the line of writing (Meulenbroek & Van Galen, 1989).

It has been argued that the position of the hand provides useful information about which hemisphere is controlling speech and language in an individual. This view conflicts with conventional wisdom, which suggests that hand posture is simply a result of training. According to the conventional view, some left-handers, encouraged to position their writing paper in the same way as right-handers, have adopted the hooked posture out of necessity. Without it, their hand hides most of what they have just written.

In contrast, it is argued that the inverted hand posture means that the speech hemisphere is ipsilateral to the preferred hand. Thus, the speech of a left-handed inverter would be controlled by the left hemisphere. The speech of a right-handed inverter would be controlled by the right hemisphere. The speech of non-inverted

writers would be controlled by the hemisphere opposite to the preferred hand (Brown, 1979).

Spotting a Left-hander

The following list has no research background, but can be detected through observation. How can you determine left-handers from afar? Here are a few possible ways:

1. By taking a ruler to the beach. The ruler is to measure arms and legs. The left limbs of left-handers are longer than those of right-handers.
2. By studying the musculature. There is greater muscular development on the left side due to the extent the left hand is used more than the right.
3. By listening for grunts, groans, and apologies. Once you spot who is doing the most apologizing, chances are you will have spotted a left-hander. Left-handers instinctively swerve to the left, which is opposite the direction most people (right-handers) swerve.
4. By studying artwork. Left-handers tend to face their figures to the right.
5. By holding a pick-up-the-small-object-with-your-toes contest. Lefties will be the ones using their left feet.
6. By noting if the person is wearing a professional baseball uniform. Professional baseball is over-represented by left-handers, nine percent higher than the average number of left-handers in the population.
7. By borrowing your doctor's brain scans.

Left-handers have eleven percent larger corpus callosums than do right-handers.

8. By watching which hand the person uses in writing. This is still deemed the full-proof test of whether a person is right-handed or left-handed (Vossler, 1987).

Teaching Left-handers

Various teaching methods and strategies have been developed for teaching those individuals who are left-handed. A particularly interesting concept involves using a computer. Apple computers have a new computer program developed by left-handedness expert and neurologist Jeannine Herron. It is called "Talking Fingers" and is designed to teach children how to write while they learn to read.

Utilizing a keyboard to write takes the pressure off left-handers learning fine motor coordination and directionality in order to communicate. The software is designed to help all children, regardless of handedness, to learn writing skills and how to build words from sounds, but is particularly applicable to the left-handed child.

Many left-handed children struggle with directionality when they first learn to write. Often letters like "C" are reversed as well as the sequence of letters in a word. With a computer doing the actual writing, the child can see the proper direction of the letters and their sequencing (Morrison, 1991).

Numerous teaching techniques have originated from brain dominance research; although little, if any, instruction is being given to teachers on procedures for teaching left-handers in the classroom. Left-handers tend to be more right-brained or split-brained. Therefore, teaching methods that use non-linear and not-verbal approaches

have a greater degree of success in teaching left-handers. Right-brained children, whichever hand they use to write with, learn by doing--a "hands-on" approach.

Part of the reason that education courses do not specifically focus on how to teach the left-handed child is that the issue of handedness and brain dominance is extremely complicated. If all left-handers automatically were right-brain dominant with speech centers in that part of the brain, then specific strategies could be developed that would always work with a left-handed child. Since this is not the case, teachers need to be made aware of the varied options and choose which works best with the individual student.

A child's preference could be genetic or it could be a result of pre-natal or post-natal injury to the left side of the brain forcing the right side to take over, as was explained earlier. Not all left-handed children have a dominant right-brain. Conversely, right-handers can be right-brain dominant, which confuses the issue further. And, adding to the fact that even though left-handers have a tendency to have a dominant side, they also use all of their brain all of the time and the brain itself is extremely flexible.

Discovering how the systems in the brain interact is an ongoing part of brain research. Research has demonstrated that ambidextrous left-handers are a higher percentage than ambidextrous right-handers. Left-handers will often switch between their right and left hands, depending on what skill or activity they are trying to accomplish. The most accepted theory for this behavior is the left-handers bilateral development of the brain. The two sides of the brain are connected by a densely-

packed bundle of nerves called the corpus callosum. Messages are crossing this area constantly, while the left-hemisphere assumes control of the motor skills and the linear, sequential function.

Therefore, when right-handers write, the messages from the right hand to the left side of the brain move there directly. For left-handers, the message must be shunted back and forth over the corpus callosum. There is a fractional difference in the time it takes, which explains the difficulty left-handers can have with writing skills.

It is clear that left-hander flexibility can be used effectively in the classroom. There are numerous ways of combining preferences and skills to develop customized strategies targeted to the needs of each individual child. There is a need for teachers needs to be flexible utilizing a variety of learning styles with their students.

Office Planning

Throughout their school years, left-handers have to deal with right-handed desks. Once they leave school and enter the work world, left-handers must assimilate to a right-handed office plan. There are desks with file drawers on the right, telephone connections that place the phone on the wrong side, computer or typewriter tables to the right of the desk, three-ring binders and spiral-bound note pads with mechanisms that interfere with writing, and pens with ink that smears while writing.

Corporations are beginning to pay more attention to the work environment for a reason...it increases productivity from fifty to three-hundred percent. Frost and Sullivan, a New York research firm, concluded that an investment equal to one year's

salary for each worker in office accouterments could achieve those results (Bullara, 1989). While setting up a left-handed office does not require such a major monetary investment, one does need to invest some time and creativity in the planning process. One mandatory office item for left-handers is the personal computer. The computer is the perfect bridge between right-brain and left-brain functions .

In the News

In a report published in the *Psychological Bulletin* of the American Psychological Association, Dr. Stanley Coren of the University of British Columbia and Dr. Diane Halpern of California State University have taken their hypothesis-- "Left-handedness: A Marker for Decreased Survival Fitness"--and made it serve as the framework for a string of small studies. This hypothesis creates a picture of doom for left-handers. Their recent study indicates that higher biological and environmental risk factors may result in reduced longevity rates for left-handers. Among individuals aged twenty, the percentage of left-handers within the present population is thirteen percent. When looking at individuals aged fifty, it is about five percent. In the eighties age group, it is below one percent. Individuals of eighty and above were born around the turn of the century. Historical records indicate that the percentage of left-handedness has not changed significantly since that time. Even though left-handers today are allowed to be more left-handed, research indicates that retraining a left-hander to be a right-hander works only for specific behaviors (Heitz, 1989). This is a controversial issue that has been taken both seriously and lightheartedly (See Appendix).

Conclusion

As can be interpreted from the preceding pages, left-handedness is accompanied by many facets of research. This paper has touched on a variety of those facets. Comprehensive research continues on the topic of left-handedness; and through this research left-handers will focus less on how to survive in a right-handed world and become an equal to his/her right-handed counterparts. Aspects within this document can be applied in both classrooms and offices and it is my intention to utilize my experience and knowledge to further facilitate the left-hander's place in society.

Appendix

It's a wonder poor lefties live past 20

By RICK HOROWITZ

I'm trying not to take this personally. I mean, I'm used to strolling through the papers every day, checking out news flashes large and small. Other people's news. "That's terrible." I mutter about someone else's disaster. "That's terrible." "That's nice." "That's terrible."

"That's me!"

True enough. Here in the paper, right where I can't possibly miss it, is a story that might as well have my name on it. "Lefties die younger, two scientists report." This is not the sort of thing I want to be reading. I read it immediately.

The "lefties" they're talking about aren't old radicals — or even young radicals — going to meet their maker ahead of schedule. No, the "lefties" they're talking about are your basic left-handed people, people just like you and me (or me, anyway). And the news the two scientists are so pleased to pass along is: Being left-handed cuts nine years off your life.

Thanks for sharing.

It seems that these two scientists — one from California, one from Vancouver — noticed a while back that older people were less likely to be left-handed than younger people. This wasn't the first time anybody had noticed that, the story said. One study 10 years ago, in fact, had found 15% of people under 20 were left-handed, but only 5% of people in their 50s, and almost nobody over 80.

So then the scientists did two studies of their own. The first looked at 2,271 old baseball players and found that "throws left, bats left" lived about eight months less on the average than "throws right, bats right." The other study used next-of-kin questionnaires for 987 dead Californians. Their beloved righties had died at an average age of 75, their lefties only made it to 66.

"It's provocative," says another scientist quoted in the article, "it's hard to believe, and it should be viewed with extreme caution."

He's got that right. There's nothing like being told time's running out even faster than you'd thought to get you provoked — and looking for explanations.

First things first. What about all those missing old lefties in that study 10 years ago? That one's easy: There weren't many left-handed octogenarians because, back when those folks were growing up left-handedness was, shall we say, strongly discouraged. Or don't you consider a sharp rap across the knuckles with a ruler strong discouragement? Lots of kids were turned around.

The old-ballplayers survey took me a minute, until I remembered: Managers back then often thought that lefties — especially lefty pitchers — were a little crazy. (Nowadays, what they pay lefty pitchers is totally crazy.) Maybe they didn't give those guys the same shot at stardom as their righty teammates. You get a couple of lefty prospects dying early of a broken heart, a few more dying of hanging curveballs to all those righty batters — that could cost you eight months, couldn't it? Absolutely.

And the dead Californians? A nine-year gap and no reason for it. No reason that you can see. From where I sit, it's obvious.

How many of those lefties starved to death in their prime trying to open a can of tuna with a right-handed can opener?

How many of those lefties bled to death trying to clip a coupon with a pair of right-handed scissors?

How many of those lefties tripped over the cord from their right-handed iron and were permanently pressed?

How many lefties died of frustration when all they could find in the sporting-goods store were right-handed baseball gloves, golf clubs, hockey sticks....?

You factor all those things in and it's a wonder we lefties have lasted as long as we have. I won't even mention being nagged to death. Studied to death.

Or worried to death by newspaper stories.

Horowitz is a syndicated columnist.

The Right Stuff for a Longer Life

Is it a health hazard to be left-handed? Statistical studies have linked the trait to everything from immune disorders to accident rates, and demographic surveys have hinted that lefties tend to die early. But there has been little direct evidence. Last week two researchers produced it. In a study published in *The New England Journal of Medicine*, psychologists Diane Halpern and Stanley Coren found that the typical right-hander lived



ILLUSTRATION BY CHIP WASS

to be 75. The average lefty died at 66.

Halpern and Coren collected death certificates from two southern California counties and, using information provided by families, classified 987 deceased people by hand preference. Women outlived men, regardless of hand preference (their average life span was 77 years, versus 71 years for the men). But right-handed women outlived left-handed women by an average

of five years, and right-handed men lived a full decade longer than their left-leaning counterparts. The researchers could only speculate on whether left-handedness is associated with specific medical problems. But the study suggested that southpaws are exceedingly accident prone. They were nearly six times as likely as right-handers to die in accidents, and four times as likely to die while driving. The lesson seems to be that, in a world built for right-handers, it pays to be one.

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